

## COLLISION-FREE MULTIPLE ACCESS RESERVATION SCHEME FOR MULTI-TONE MODULATION LINKS

### Abstract of the Invention

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A method is provided for multiple remote units (RU)s to efficiently utilize resources on a shared OFDM high speed data channel without collisions. A collision occurs when two or more RUs transmit on the same frequency at the same time. The method defines two distinct states for accessing the channel. These are the Arbitration state and the Data Transfer state. A base station transmits a flag on the downlink to notify the RUs of which state is in effect. RUs having a data message notify the base station by transmitting a frequency tone, which acts as a request to transmit data, during the arbitration state. The tone frequencies are frequency spaced to be mutually orthogonal, so that the base station can receive all the uplink requests simultaneously. Upon receiving the uplink request signals, the base station establishes the data transfer state and orders the uplink data messages from the remote units is a non-interfering sequence. A system for preventing uplink data message collisions in an OFDM communications system is also provided.

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